

ABSTRACT OF THE DISCLOSURE

A system 10 is provided for recovering the potential energy of a hydrogen gas fuel supply within a fuel cell powered vehicle 14. The system 10 includes a conventional storage tank 16 which receives and stores hydrogen gas at a relatively high pressure, an expander 18, a compressor 20, a motor/generator 76 which selectively generates electrical power and torque, pressure regulators 22, 24, a valve 26, an electrical charge storage device or battery 28, a controller 30, vehicle sensors 32 and electrical switches or switching module 34. The system 10 selectively channels pressurized hydrogen gas through expander 18 which lowers the pressure of the hydrogen gas, rotatably drives compressor 20 and generates electricity. Controller 30 causes the generated electricity to be selectively communicated to electrical accessories 72, and/or to battery 28 by use of switching module 34, based upon vehicle attribute data received from sensors 32. Based upon the attribute data, controller 30 may also signal valve 26 to bypass expander 18, and cause electrical power to be supplied to motor/generator 76 from battery 28 to drive compressor 20.